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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,256	10/30/2003	Chih-Chen Cho	500982.02 (30016/US/2)	9603
27076	7590	12/19/2005	EXAMINER	
DORSEY & WHITNEY LLP INTELLECTUAL PROPERTY DEPARTMENT SUITE 3400 1420 FIFTH AVENUE SEATTLE, WA 98101			THOMAS, TONIAE M	
			ART UNIT	PAPER NUMBER
			2822	
DATE MAILED: 12/19/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/699,256

Applicant(s)

CHO ET AL.

Examiner

Toniae M. Thomas

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 and 25-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-18 and 44 is/are allowed.
- 6) ☒ Claim(s) 25-32 and 38-43 is/are rejected.
- 7) ☒ Claim(s) 33-37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/31/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to the amendment filed on 03 October 2005.

Currently, claims 1-18 and 25-44 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. *Claims 32, 38, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Liaw et al. (US 5,843,816).*

The Liaw et al. patent (Liaw) discloses a method for making a semiconductor memory device (figs. 2A-2I and accompanying text). The method comprises: forming at least two gate stacks, the gate stacks including polycrystalline silicon (polysilicon) (fig. 2A and col. 5, line 48 - col. 6, line 3); forming a non-conductive stack including a stopping layer 40 and an ILD layer over the gate stacks (fig. 2F and col. 6, lines 61- col. 7, line 4); forming trenches W3, W4, W5, W6 by etching the nonconductive stack using a self-aligned contact (SAC) process, thereby exposing a portion of the polysilicon in at least one trench (fig. 2G and col. 7, lines 16-22); and filling the trenches W3, W4, W5, W6 with metallization layers PL1, PL2, PL3, PL4, respectively (fig. 2I and col. 7, lines 59-65).

The stopping layer includes an antireflective compound, silicon nitride (col. 6, lines 61-65); and the ILD layer includes borophosphosilicate glass - TEOS (col. 7, lines 1-4).

The prior art range of thickness includes 300 Å (col. 6, lines 61-65).

The metallization layers PL1, PL2, PL3, and PL4 comprise titanium, titanium nitride, and tungsten (col. 7, lines 42-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. *Claims 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw in view of Hashimoto et al. (US 6,069,038).¹*

Liaw does not teach that the polysilicon is a dual doped polysilicon.

The Hashimoto et al. patent (Hashimoto) discloses a method for making a semiconductor memory device (figs. 3-28 and accompanying text). The method comprises forming the gate layer using a dual doped polysilicon layer (col. 9, lines 39-47).

Since Liaw and Hashimoto are both from the same field of endeavor, the purpose for which Hashimoto is relied upon would have been recognized in the

¹ The Hashimoto patent was relied upon in the previous Office action.

pertinent art of Liaw by one of ordinary skill in the art at the time the invention was made.

One having ordinary skill in the art would have been motivated to modify Liaw, at the time the invention was made, by forming the polysilicon of a dual doped polysilicon, as taught by Hashimoto, because with dual doped polysilicon it is possible to form both p-type and n-type gate electrodes using a single strip of polysilicon. This is ideal for CMOS device, such as memory devices, since these devices require both p-type and n-type gate electrodes.

4. *Claims 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liaw et al. in view of Cederbaum et al. (US 5,320,975).*

Liaw lacks anticipation of: filling the trench with a silicide.

The Cederbaum et al. patent (Cederbaum) discloses a method that is compatible with Hashimoto (fig. 3H and accompanying text). The method comprises forming an opening 40a/41a, and filling the opening with a metallization layer 46, which comprises a silicide compound 42a/42b, a barrier layer 45, and a conductive layer 46 (fig. 3H and col. 5, line 61 – col. 6, line 3).

Since Liaw and Cederbaum are both from the same field of endeavor, the purpose for which Cederbaum is relied upon would have been recognized in the pertinent art of Liaw. by one of ordinary skill in the art at the time the invention was made.

One having ordinary skill in the art would have been motivated to modify Liaw, at the time the invention was made, by forming a silicide layer as part of

the metallization layer, as taught by Cederbaum, because the silicide layer lowers the resistivity of the ohmic contact between the barrier layer and a source/drain region.

Allowable Subject Matter

5. Claims 1-18 and 44 are allowable over the prior art of record. Claims 33-37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments with respect to claims 1-18 and 25-44 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

Art Unit: 2822

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMT
12 December 2005



Mary Wilczewski
Primary Examiner